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ABSTRACT

Colleges of Education (COEs) use the World Wide Web to disseminate and gather information. Online barriers limit the accessibility of the Web for individuals with disabilities. This study evaluated the accessibility of COE home pages. Two hundred and fifty Web sites were randomly selected for evaluation. A software program was used to quantify the number of accessibility errors at each site. The results indicated that most (79%) institutions of higher education home pages had accessibility problems, and the majority of these problems (67%) of the errors were severe problems that should be given a high priority for correcting. The good news is that the majority (74%) of the errors can easily be corrected. The work reflects a need for COEs to examine the accessibility of their home pages. Direction for improving accessibility is provided. Two tables present information on type of accessibility error, percent, severity, and ease to correct, and World Wide Web resources. (Contains 12 references.) (Author/AEF)

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Accessibility of Schools and Colleges of Education Home Pages for Individuals with Disabilities

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Accessibility of Schools and Colleges of Education Home Pages for Individuals with Disabilities

Abstract

Colleges of Education (COEs) use the WWW to disseminate and gather information. On-line barriers limit the accessibility of the WWW for individuals with disabilities. The purpose of this study was to evaluate the accessibility of COE home pages. Two hundred and fifty Web sites were randomly selected for evaluation. A software program was used to quantify the number of accessibility errors at each site. The results indicated that most (79%) institution of higher education home pages had accessibility problems, and the majority of these problems (67%) of the errors were severe problems that should be given a high priority for correcting. The good news is that the majority (74%) of the errors can easily be corrected. The work reflects a need for COEs to examine the accessibility of their home pages. Direction for improving accessibility is provided.

Accessibility of Schools and Colleges of Education Home Pages for Individuals with Disabilities

When the World Wide Web was invented in 1991 it was intended to be a medium through which textual information could be easily and instantly shared among researchers. Since this time the Web has experienced explosive growth, incorporating not only text but rich graphics, audio, video, and even three-dimensional representations. As a result of this growth, the Web's original role, as a medium for the dissemination research data, has changed dramatically. Now, the Web is used by a wide variety of organizations for the instant dissemination of a wide variety of information (Ford, 1995). Ironically, Colleges of Education (COE's) have found what was originally a research tool to be an invaluable tool for everything from recruitment to providing instantaneous access to sensitive student data such as transcripts.

Along with the explosive growth of the World Wide Web, significant changes have been taking place with regards to accessibility among people with disabilities. The increasing awareness of persons with disabilities and their needs for equitable accessibility to buildings and services culminated in The Americans with Disabilities Act (ADA) of 1990. This congressional act provides the same civil rights protection to individuals with disabilities that apply as a result of race, gender, national origin, and religion (Button & Wobschall, 1994). Many Institution's of Higher Education have striven to meet the challenges of the American's with Disabilities Act, specifically Title III of the ADA which directs that public facilities make reasonable modifications to control discrimination and support accessibility in policies, practices, and procedures (Council for Exceptional Children, 1994). This challenge has been met in a variety of ways including everything from providing accessibility to buildings to establishing centers for

students with disabilities. In fact, many Institutions of Higher Education along with Colleges of Education have been at the forefront of helping the larger society identify and resolve accessibility issues for students with disabilities.

As a result of this landmark legislation, accessibility alterations like providing ramps to elevated areas and providing accessible signage through height adjustments and raised lettering have become commonplace. For example, Osfield (1993) provided a report regarding access by individuals with disabilities to the programs, services, and activities provided to students, staff, faculty, and the community-at-large. Literature guiding libraries in efforts to offer services that comply with the ADA was examined by Mendle (1995) and Chalfen and Farb (1996) described adaptive computing technology guidelines applied in the design of the online information system at the University of California Los Angeles.

In many ways, The World Wide Web (WWW) has become an invaluable tool for many students with disabilities. Accessibility across platforms and geographic distance makes the WWW an ideal universal tool for students with disabilities. Wang (1997) discussed use of the Internet for increased self-advocacy by individuals with physical impairments and disabilities. Approximately 8% of all WWW users have a disability (Capozzi, 1998). It is ironic, however that while technical developments have enhanced and provided new exciting opportunities for the WWW, they have, at the same time, complicated and limited the accessibility of the content and resources for individuals with disabilities.

Physical barriers are obvious accessibility concerns confronting individuals with disabilities. Web page developers need to be just as aware that on-line barriers can create significant accessibility problems for some users. The Americans with Disabilities Act requires that all organizations make reasonable accommodations for individuals with disabilities. Using

the WWW as a resource for distributing information is no exception. It is important that COE Web page developers use and follow standards that allow accessibility to all WWW users.

A variety of disabilities can reduce accessibility to the WWW. Visual, hearing, movement, cognitive, speech, and other impairments can limit availability of information. Assisted technologies or accessibility aids, such as Braille output systems, modification of keyboards, screen enlargement utilities, voice output utilities, and other technologies allow individuals with disabilities to access information on the WWW. However, because of the complexity of many Internet resources, some information cannot be accessed with these aids. Developers of accessibility aids continue to identify and develop features that can overcome some of these barriers, but there are many things that Web page developers can do, with very little effort, that would make their pages more accessible.

The Trace Research and Development Center at the University of Wisconsin at Madison produced the Unified Web Site Accessibility Guidelines (1998). These guidelines were transferred to the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C). The W3C is a nonprofit organization that oversees the development of standards for the WWW. Using the Unified Web Site Accessibility Guidelines, the W3C produced HTML Author Guidelines -- version 1.0 (1998). According to the guidelines, measures for improving accessibility falls into the following categories: (a) structure--HTML documents should use markup to convey meaning and less for format and layout pages; (b) navigation—authors should support keyboard-only navigation and methods to facilitate orientation; and (c) alternative content—authors should always provide alternative ways to access information presented with images, sounds, applets, and scripts. Additionally, the WAI provides specific recommendations and strategies on how to produce web pages that are in agreement with the guidelines. Examples

and models of the appropriate use of HTML tags (i.e., page title, text, lists and outlining, tables, links, objects, images, audio, applet, frames, forms, scripts) and elements are provided

The W3C's commitment to lead the Web to its full potential includes promoting a high degree of usability for people with disabilities. Building Web sites that comply with standards for accessibility should be a high priority for Web page developers. To date, little research has been completed documenting the extent to which accessibility goals have been reached.

Method

This study examined the accessibility of COE home pages. The purpose of research described in this article was to: (a) evaluate the accessibility of institutions of higher education home pages, and (b) direct readers to resources that are available to assist in the development of accessible home pages.

Sampling

A list of URLs for Colleges and Schools of education was generated using the Infoseek search engine (1998). The descriptors "college of education" and "schools of education" were used to search for university Web sites. Infoseek provided a directory of topics that listed "colleges and universities in the US." This directory was chosen, and a list of universities within the United States was produced. A total of 1259 American Universities URLs were identified and organized in alphabetical order. A pseudo random number generator was used to randomly select 250 college of educations' home pages that would be evaluated in this study.

Evaluation Process

Each COE home page was evaluated using Bobby 3.0 which is a a piece of software avalible from the Center for Applied Special Technology (1998). This software package analyzes Web pages in accordance with the W3C Web Accessibility Initiative's guidelines. This

is done by installing the software on a computer attached to the internet. The use of the software then specifies a web site by entering the address for the WWW site to be analyzed in the submission screen. Results from Bobby 3.0 provide a measure of the extent to which a Web site is accessible for people with disabilities. The type of accessibility error, the severity of the error (e.g., low, medium, high), and the ease with which the error can be fixed (e.g., easy, moderate, hard) are provided in a summary report. Types of accessibility errors include images which do not provide textual descriptions, links that do not provide textual descriptions, and text pages which are not usable unless they are associated with a frames page. In this study only the initial COE page was evaluated and no links within the domain were evaluated. Scores for each home page were tabulated and analyzed.

There are many accessibility issues that Bobby 3.0 cannot detect. For example, Bobby 3.0 cannot determine programmatically if the web site is following accessibility principles, and can only draw the users attention to the potential risks of any technology that is used

Results

Seventy-nine percent (± 4.89) of the university Web pages had at least one accessibility error. On average, there were 6.38 ($\underline{s}$ = 8.82) accessibility errors per page. The types of accessibility errors are illustrated in Table 1. The most common accessibility problems identified in home pages of COEs were (a) not providing alternative text for all images and hot-spots on images, (b) client-side image maps with links were not represented elsewhere on the page, and (c) insufficient information to determine language of text used in presenting information. Absence of alternative methods of conveying information and other accessibility errors each were evident in less than 5% of home pages. Most (67%) of the accessibility errors were rated as being high priority (e.g., highest severity rating); links not associated with phrases describing the

link(s) was the only low severity error identified. Seventy-four percent of all the accessibility errors were rated as easy to fix. All of the most common errors (those occurring in 9-33% of the home pages) were easy to correct except client-side image maps with links not presented elsewhere on the page.

Discussion

The Americans with Disabilities Act directs that individuals with disabilities are entitled to the same civil rights protections as their neighbors and peers without disabilities. The law has come to be associated with efforts to make public and private facilities and institutions more accessible for individuals with disabilities. The Internet and World Wide Web have revolutionized access to resources and services of American business, public and private institutions, and other organizations. The accessibility of this information to individuals with disabilities has not been extensively studied.

Colleges of Education use the WWW to disseminate and gather information. On-line barriers limit the accessibility of the WWW for individuals with disabilities. The purpose of this study was to evaluate the accessibility of COE home pages. Two hundred and fifty web sites were randomly selected for evaluation. A software program was used to quantify the number of accessibility errors at each site. Most COE home pages had accessibility problems (79%). Most of the errors were rated as severe and should be given a high priority (67%). The good news is that the majority of the errors can easily be corrected (74%). The need for COEs to examine the accessibility of their home pages is evident in the outcomes.

One global suggestion for web page designer is that all web pages should be encoded for meaning rather than appearance. For example, providing alternative ways of obtaining information is a key to overcoming many accessibility errors. For example, by using additional

text to describe images approximately one-third of the errors discovered in this study would be fixed.

There are many Web sites that provide information and recommendations for accessible web pages. Below are a few recommendations for evaluating Web sites for accessibility:

1. Web page designers should follow the accessibility guidelines. There are several sites on the WWW that give recommendations Table 2 provides the reader with a list of these resources as well as WWW addresses.
2. Each web page should be tested for accessibility. Several different procedures should be used: (a) view each page on monochrome screen or use high contrast option of control panel; (b) turn off graphics and view page for readability or use Lynx to view the page; (c) select only text, print to clipboard, and view for readability; (d) navigate using only the keyboard; and (e) use Bobby or other Web evaluation software to test the web pages.
3. Web page designers should provide a "text only" version of the COE's Web site. This can be done using techniques such as cascading style sheets so that updates can be accomplished more easily. Providing a text only version of a Web site also provides users with slow Internet connections with a relatively fast method of accessing an institutions Web site.
4. Web page designers should provide the reader with alternative methods for obtaining information about the COE. Providing a phone number, email, or mailing address can do this. This information should be displayed in a prominent place on the COE's Web site.

Page authors should not produce "handicapped products" to make web pages accessible. Every effort should be made to keep all web pages in the mainstream and provide elements that allow universal access. The accessibility guidelines are not designed to stifle the creative

freedom of web page designers; however, extra thought and effort are required in designing accessible web pages.

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Table 1

Type of Accessibility Error

Type of Accessibility Error	%	Severity	Ease to correct
All images did not have alternative text	52.79	High	Easy
Language of the text was not identified.	12.08	Medium	Easy
Client-side image map has a link not represented as a textual link elsewhere on the page.	10.34	Medium	Moderate
No alternative text for image hot-spots	7.50		
All image map hot-spots did not have alternative text	4.39	High	Easy
Tables were used to format text information	3.84	Medium	Hard
Form controls did not specify a logical tab order.	2.01	Medium	Easy
Frame does not have a title	1.37	High	Easy
Frame does not have a description	1.37	High	Easy
Links are not associated with phrases	1.19	Low	Easy
Form does not have label	1.01	Medium	Moderate
No alternative text for each APPLET	0.73	High	Moderate
SCRIPT does not have alternative method of conveying information	0.64	High	Moderate
Provide alternative for SCRIPTS	0.64		
Server-side image maps without alternative method	0.46	High	Hard
Each page is not readable and usable without frame	0.09	High	Hard

Table 2

World Wide Web Resources

Guidelines	Description
World Wide Web Consortium (W3C) Web Accessibility Initiative http://www.w3.org/WAI/GL/central.htm	This online document by a subgroup of the World Wide Web consortium provides guidelines for making Web sites assessable to persons with handicaps. The W3C is responsible for setting international standards for web technologies.
Microsoft Guidelines for Accessible Web pages www.microsoft.com/enable/dev/web_guidelines.htm	This online document provided by Microsoft provides guidelines for making Web sites more handicapped assessable. Microsoft is a leading manufacture of PC based software and makes several web development tools.
Sun Microsystems' "Accessible Design for Users with Disabilities" http://www.sun.com/columns/alertbox/9610.html	This online document by Sun Microsystems provides a set of guidelines for developing handicap accessible Web sites. Sun a leading manufacture of Web servers and other internet technologies.
NCD Congressional Mandate	These online documents provide

www.ncd.gov/mandate.html	federally developed guidelines for the development of handicapped accessible web pages. The National Council on Disability is a federal agency whose charge is to develop guidelines on a range of accessibility issues.
On-Line Tools	
W3C HTML Validation Service http://validator.w3.org/	Users can submit a Web address to this service that will then automatically check the associated web page(s) for compliance with current W3C accessibility standards.
Center for Applied Special Technology--Bobby 3.0 http://www.cast.org/bobby/	Bobby is a downloadable software utility that will check a web site and return information to the user as to the sites accessibility.

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